Agency of Environmental Conservation
Department of Forests, Parks & Recreation

State of Vermont

FOREST INSECT AND DISEASE CONDITIONS
NORTHERN REGION

Calendar Year 1983

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INSECT AND DISEASE HIGHLIGHTS
NORTHERN REGION

Gypsy Moth populations collapsed completely, with no defoliation detected this year.

Forest Tent Caterpillar populations collapsed, with only 180 acres of defoliation detected compared to 321,693 acres in 1982. But tree dieback and mortality is increasing in stands previously defoliated.

Maple Leaf Cutter populations decreased to mostly light levels, with only 1,017 acres of moderate to heavy defoliation detected compared to 13,526 acres in this category in 1982.

Bruce Spanworm populations increased, causing light to moderate defoliation on at least 20,000 acres but damage was confined to the understory and lower crowns of hardwoods, especially sugar maple. Populations are expected to increase further in 1984.

Birch Skeletonizer and Birch Leaf Folder defoliation decreased from 38,250 acres in 1982 to 1,272 acres of only light defoliation in 1983.

Spruce Budworm defoliation [redacted] increased from 153,852 acres in 1982 to 178,086 acres in 1983. 1712 acres of spruce-fir were protected by aerial applications of Bacillus thuringiensis.

Scleroderris Canker was not detected in any new towns this year but two Scots pine Christmas tree plantations within the quarantine area were found to be infected. The disease is now known to be present in 98 plantations comprising 777 acres.

White Pine Needle Blight, thought to be a physiological disease brought on by unusual weather conditions, caused widespread browning of current needles on individual white pines.

Larch Decline and mortality is now present on 7169 acres but larches in only about half these acres are currently exhibiting decline symptoms.

Hardwood Decline was very evident this year possibly due to the unusual weather which caused leaf scorch, anthracnose, drought stress, and premature leaf fall. Dieback and off-color was particularly evident on maples on shallow upper elevation sites and stands previously defoliated by forest tent caterpillar.

INTRODUCTION

The information in this report is based largely on aerial surveys to detect defoliation, as well as ground surveys and observations of Forest Resource Protection personnel and other forestry staff. Aerial surveys were conducted in July to detect most major defoliators and again in late August in portions of the region where maple leaf cutter and late season birch defoliators were likely to be present.

Unusual weather conditions occurred this year, beginning with a very mild winter of below average snowfall. April and May were much wetter and colder than normal (May was the wettest on record for Vermont), followed by extremely warm, dry weather during late June and July.

Many hardwoods showed signs of stress by late summer, with leaf scorch and anthracnose, especially on maples, being very common. Hardwoods on upper elevations and shallow soils exhibited the most off-color and dieback of many tree species was more noticeable than usual.

FOREST INSECTS

Hardwood Defoliators

Gypsy moth, Lymantria dispar, populations collapsed completely, with no defoliation detected. Even the few areas with some defoliation in 1983 that looked as though they had building populations collapsed this year and no egg masses for next year could be found.

Forest Tent Caterpillar, Malacosoma disstria populations completely collapsed, from a peak of 321,693 acres in 1982 to only 180 acres of moderate defoliation in the town of Westfield in Orleans County aerially visible in 1983. Many areas defoliated in the past were off-color this year and similar in appearance to defoliation damage, but ground checks revealed few if any caterpillars present.

Areas of tree mortality are becoming more evident where forest tent caterpillars caused moderate-heavy defoliation during 2 or more of the previous three years. Mortality was widely scattered and therefore could not be easily mapped during the aerial survey.

Two years of data from plots established in 1982 in Camel's Hump State Forest indicate that partial cutting of a hardwood stand at the end of a defoliator outbreak may have a beneficial effect on residual trees. Plots were established to compare tree condition in an area that underwent a shelterwood harvest (to basal area of 50) in the winter of 1981-82 to an adjacent uncut area (basal area of 110). Both areas were heavily defoliated by forest tent caterpillar in 1980 and 81 and averaged over 30% crown dieback on plot trees, mostly sugar maple, in 1982. In September, 1983, crown condition of trees in the harvested area remained unchanged or slightly improved while many of those in the uncut area showed an increase in dieback. This contrasts with past observations that harvests just before or during the early years of an outbreak increases the resulting amount of defoliation and dieback. Presumably, damaged trees in the harvested area are benefiting from increased light and nutrient availability but more observations and data are needed before management recommendations can be finalized.

Maple Leaf Cutter, Paraclemensia acerifoliella, remains widespread but most of the damage is either light or restricted to the understory and lower portions of sugar maple crowns so that it cannot be aerially detected. Only 1017 acres, mostly in Washington County were detected as having moderate to heavy defoliation compared to 13,526 acres in this category in 1982. One 13 acre sugarbush in Braintree was aerially sprayed July 16 with Sevin 80S plus sticker to control a persistent infestation, with excellent results.

Saddled Prominent, Heterocampa guttivata, larvae were not detected at all this year, following only trace to light defoliation in 1982. Two of three areas in Orange County that were intensively surveyed in 1981 and 82 for extent of decline and mortality following defoliation in 1980 by saddled prominent underwent salvage harvests in 1983. The third area was evaluated in 1981 and again this year (Table 1). Observations in this area as well as uncut portions of the Chelsea area indicate that mortality has tapered off and most trees that are not now dead or dying are beginning to improve in terms of foliage quality and abundance. Most trees that retained at least 60 percent of their original crowns are still alive, and though defect due to dead tops is likely to be substantial, they are providing some shelter to the developing understory. Sugar maples and some white ash in these stands are now beginning to outgrow the Rubus, striped maple, and pin cherry.

TABLE 1 TREE CONDITION FROM 1981-83 FOR AN ORANGE COUNTY STAND FOLLOWING HEAVY DEFOLIATION BY SADDLED PROMINENT

Town	Site Quality for Northern Hardwoods	Percent of Trees					
		Dying 1981	Dead 1981	Dying 1982	Dead 1982	Dying 1983	Dead 1983
Vershire	Good	63	9	-	32*	18	50

*Estimated in 1983

Bruce Spanworm, Operophtera bruceata, a hardwood defoliator (Figure 1) that caused light to moderate understory damage in 1982 was even heavier and more widespread this year but damage remained limited to the understory and lower crowns of the overstory trees. Despite the fact that aerial detection of this pest was not possible, 20,860 acres of light to moderate defoliation are estimated from ground surveys (Table 2). This should be considered an underestimate of the total acres infested, but reflects the fact that the heaviest damage was in the Northeast Kingdom.

TABLE 2 1983 BRUCE SPANWORM DEFOLIATION

County	Towns Affected	Acres of Light to Moderate Defoliation
Caledonia	Groton, Barnet	10,050
Essex	Victory	5,000
Orange	Washington, Vershire	50
Orleans	Barton, Greensboro, Glover, Irasburg, Westmore	5,500
Washington	Cabot	260
Total		20,860

Heavy spanworm defoliation of sugar maple that began to show up in the understory of numerous sugarbushes in early June had sugarmakers concerned but the insect completed its life cycle without much damage to dominant trees. Sugarmakers in the towns of Cabot and Glover are interested in spraying to control the insect in 1984 should populations increase as expected.

Birch Skeletonizer, Bucculatrix canadensisella and Birch Leaf Folder, Ancylis discigerana, responsible for over 38,000 acres of defoliation in 1982, dropped to light population levels that were detectable on only 1,272 acres in the Northeast Kingdom (Table 3). Birch skeletonizer was the predominant insect present on the yellow and white birches receiving late defoliation this year.

TABLE 3 1983 BIRCH SKELETONIZER-BIRCH LEAF FOLDER DEFOLIATION

County	Towns Affected	Acres of Light Defoliation
Caledonia	Peacham	264
Essex	East Haven, Norton	527
Orleans	Newport	62
Washington	Calais, East Montpelier, Marshfield	419
Total		1272

Maple Webworm, Tetralopha asperatella, was occasionally found on sugar maples but was much less common than in 1982.

Maple Trumpet Skeletonizer, Epinotia aceriella, caused widely scattered light defoliation of sugar maple again this year.

A solitary leaf roller, Sparganothis pettitana, was only occasionally seen on sugar maple and was much less evident than in previous years.

Locust Leaf Miner, Odontata dorsalis, caused scattered defoliation of ornamentals and roadside trees.

Elm Leaf Beetle, Pyrrhalta luteola, caused scattered light to moderate defoliation of elms.

Eastern Tent Caterpillar, Malacosoma americanum, populations dropped to even lower levels than in 1982 and caused only occasional damage to cherry and apple in scattered locations.

Mountain Ash Sawfly, Pristophora geniculata, caused the usual scattered heavy defoliation of ornamental mountain ashes.

Uglynest Caterpillar, Archips cerasivoranus, was occasionally seen again this year on chokecherry in Lamoille County but only young colonies were observed.

The oak leaftier complex responsible for light to moderate defoliation of oak in Middlesex and Waterbury in the past dropped to very light population levels this year.

Birch Leaf Miner, Fenusa pusilla, again caused widespread defoliation of white and gray birch but damage was lighter than in previous years.

Satin Moth, Leuc[illegible] salicis, was observed only on [illegible]e poplar shade tree in the town of Essex.

A dagger moth, Acronicta sp was observed feeding on elm in Swanton (Franklin Co.)

The following were not observed:

Linden Looper	Erranis tiliaria
Spring Cankerworm	Paleacrita vernata
Fall Cankerworm	Alsophila pometaria
Orange-Humped Mapleworm	Symmerista leucytis
Green Fruitworm	Lithophane antennata
Half Winged Geometer	Phigalia titea
Green-Striped Mapleworm	Anisota rubicunda
Large Aspen Tortrix	Choristoneura conflictana
Spiny Elm Caterpillar	Nymphalis antiopa
Cherry Scallop Shell Moth	Hydria prunivorata
Pear Sawfly	Caliroa cerasi
Maple Petiole Borer	Caulocampus acericaulis

Softwood Defoliators

Spruce Budworm, Choristoneura fumiferana, (Figure 2) defoliation damage as determined by aerial survey, increased from 153,852 acres in 1982 to 178,086 acres in 1983 (Map 1, Table 4).

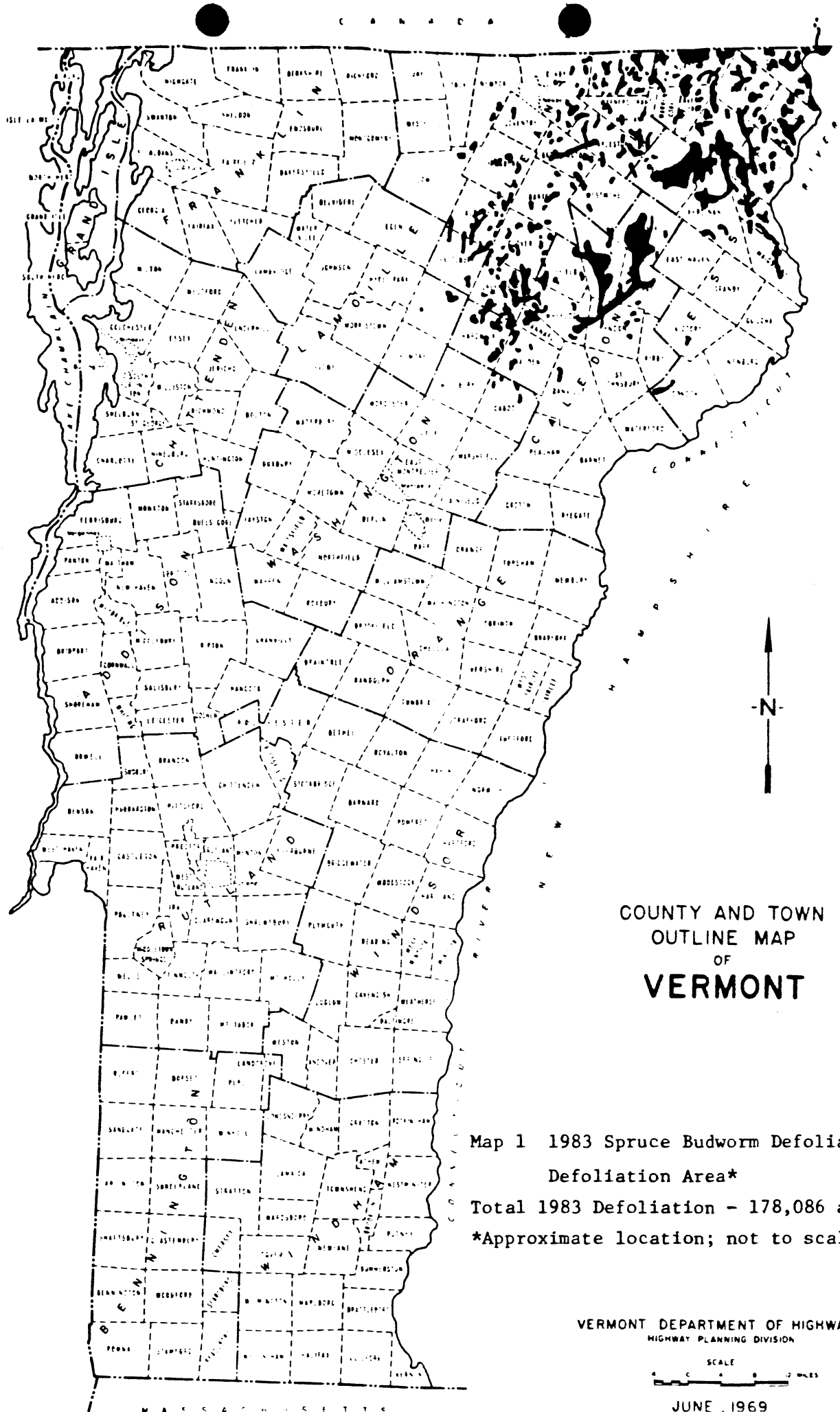
TABLE 4 1983 SPRUCE BUDWORM DEFOLIATION

County	Acres Defoliated[1] Light[2]	Moderate	Heavy	Total
Caledonia	10,313	8,173	23,254	41,740
Essex	32,713	10,299	21,864	64,876
Lamoille	1,100	349	194	1,643
Orleans	17,234	15,313	35,359	67,906
Washington	1,921	0	0	1,921
Total	63,281	34,134	80,671	178,086

[1] Light defoliation = yellow to light brown tops present.
Moderate defoliation = red to brown color of top 50% or less of the crown on most trees.
Heavy defoliation = red to brown color of over 50% of the crown on most trees. Stand brown.

[2] Includes 36,552 acres estimated from ground checks but not visible from the air.

Ground surveys indicate that actual defoliation in most locations was somewhat lighter than in 1982, possibly due to the cool, wet spring. An analysis of defoliation of individual branch samples from 30 locations scattered throughout the infested area shows that defoliation damage decreased in 60% of the plots, stayed the same in 10%, and increased in 30%. Any decrease was probably masked by years of past defoliation damage when stands were broadly classified by the 1983 aerial survey.



COUNTY AND TOWN OUTLINE MAP OF VERMONT

Map 1 1983 Spruce Budworm Defoliation

Defoliation Area*

Total 1983 Defoliation - 178,086 acres

*Approximate location; not to scale

VERMONT DEPARTMENT OF HIGHWAYS
HIGHWAY PLANNING DIVISION

SCALE

JUNE 1969

Many spruce-fir stands appear to be shifting from the light and moderate to moderate and heavy categories, with a corresponding increase in acres exhibiting tree mortality (Table 5).

TABLE 5 ACRES OF MORTALITY IN 1983 DUE TO SPRUCE BUDWORM

County	Acres of Mortality[1]			
	Light	Moderate	Heavy	Total
Caledonia	8,173	17,440	5,814	31,427
Essex	10,229	16,398	5,466	32,093
Lamoille	0	44	150	194
Orleans	15,313	26,519	8,840	50,672
Washington	0	0	0	0
Total	33,715	60,401	20,270	114,386

[1] Light mortality = 1-10%, scattered or patchy.
Moderate mortality = 10-25%, scattered.
Heavy mortality = over 25%.

A suppression project was conducted this year in an effort to provide some relief to owners of spruce-fir woodlots threatened with impending or increased losses due to budworm-caused tree mortality (Figures 3 & 4). Project costs of $14.00 per acre were shared with the state (25%) and federal (75%) governments so that landowner cost was only $3.50 per acre. A total of 1712 acres in Orleans and Caledonia counties were sprayed with the bacterium Bacillus thuringiensis (B.t.) Three formulations of B.t. - Thuricide 32 LV, Bactospeine FC, and Dipel 6L were applied to 18, 8 and 6 blocks, respectively, totaling 640, 659, and 413 acres. The formulations were each applied at 12 BIU per acre mixed with water to a total volume of 3 quarts per acre, using a small fixed-wing aircraft. The plane operated out of Caledonia County airport on June 1-3.

The goal of the suppression project to save at least 40% of current foliage (keep defoliation below 60%) was achieved, with vitually no difference in efficacy between the three formulations. Percent defoliation after budworm had stopped feeding averaged 38% for the sprayed stands compared to 59% for 3 untreated stands that were monitored.

Since spraying is recognized as only a short-term solution to the budworm problem, the department seeks to improve the marketing and use opportunities for spruce-fir, including dead material and promote forest management practices to reduce present and future losses. To that end, a Spruce Budworm Demonstration Project was initiated in 1983, with Sam Hudson as Project Forester. This project is designed to provide advanced training and accelerate monitoring and evaluation, utilization, landowner assistance and management within nine towns comprising 130,000 acres in the counties of Caledonia, Lamoille, and Orleans

Spruce Bud Moth, Zeiraphera canadensis, remains abundant on white spruce, especially in the Northeast Kingdom, but damage is light. This insect is causing some concern to growers of white spruce Christmas trees, where the insect and damage are often confused with spruce budworm.

Red-headed Pine Sawfly, Neodiprion lecontei, was detected only on roadside trees in Franklin County.

Arborvitae Leaf Miner, Argyresthia thiuella, damage to cedar remains widespread but light in most locations.

Yellow-headed Spruce Sawfly, Pikonema alaskensis, was reported defoliating ornamental blue spruces in Wolcott (Lamoille County).

The following were not observed:

Larch Sawfly	Pristophora erichsonii
White Pine Sawfly	Neodiprion pinetum
Introduced Pine Sawfly	Diprion similis

Sapsucking Insects, Midges, and Mites

Balsam Gall Midge, Paradiplosis tumifex, populations remained high in many balsam fir Christmas tree plantations, forcing many growers to resort to chemical control with Diazinon AG500. Twenty-five plantations totaling nearly 400 acres are known to have been treated using various types of ground equipment, with fair to excellent results. An additional 3 plantations comprising about 200 acres were aerially treated. Experimental treatments with a hydraulic application, 2 teaspoons of Diazinon AG500 per gallon of water at various stages of growth, were conducted in a heavily infested plantation in Johnson. Preliminary results indicate that a double application beginning when the terminal shoots in the upper third of the crowns average 1¼ inches long, with a second application about 1 week later gave the best results, with nearly 100% control. But single treatments when terminals were at least 1¼ inches long and no more than 2 inches long gave good control (88-91%). Treatments applied when shoots were less than 1¼ inches long or greater than 2 inches long were not as good but still were much better than no treatment. Best timing for control also corresponded well with the time period in which the majority of balsam fir shoots were flaring.

An egg parasite of balsam gall midge, tentatively identified as Platygaster sp. was observed in great abundance in heavily infested plantations in Stowe and Johnson. These small black wasps began emerging about the same time as gall midge and were observed ovipositing on new shoots shortly after gall midges had begun ovipositing. They continued to emerge for a short while after gall midge adults had tapered off. Unfortunately, this parasite does not destroy its host until the gall midge and galls are fully developed but it should reduce the midge populations for 1984.

Balsam Woolly Aphid, Adelges piceae, was observed on balsam fir in Caledonia County but no recent mortality from this insect was reported.

Balsam Twig Aphid, Mindarus abietinus, populations increased over 1982 numbers and caused moderate to heavy damage in some Christmas tree plantations. Some growers sprayed their plantations to prevent damage. Overall, populations do not appear to have peaked yet, so heavier damage is expected in 1984.

Eastern Spruce Gall Aphid, Adelges abietis, damage to ornamental spruces was reported as common on ornamentals and Christmas trees throughout much of the region but new galls were much less common than in the past in Lamoille County.

A root aphid, Prociphilus americanus, was reported damaging roots of balsam and fraser fir in a Christmas tree transplant bed in Wolcott, requiring a soil drench insecticide treatment

Pine Bark Aphid, Pineus strobi, was less abundant on white pine than in recent years.

Pine Spittlebug, Aphrophora parallela, was reported as abundant on Scots pine in a Danville Christmas tree plantation.

Pine Needle Scale, Chionaspis pinifoliae, caused scattered heavy damage to ornamental plantings of mugho pine.

Bud, Shoot, and Stem Insects

Balsam Shootboring Sawfly, Pleroneura brunneicornis, damage to balsam fir shoots was not observed at all this year despite widespread noticeable damage in 1982. In Ontario, the larvae are reported to be abundant only every second year in any one locality, apparently spending a full year in a cocoon in the ground. Plantations that were heavily infested in 1982 will be monitored next spring to see if the same holds true for Vermont.

White Pine Weevil, Pissodes strobi, damage to spruce and pine terminals appeared to be more common than usual throughout most of the region.

Pales Weevil, Hylobius pales, caused only light damage to a Christmas tree plantation in Morristown (Lamoille County).

Pine Gall Weevil, Podapion gallicola, caused overall light damage to red pine in Thetford State Forest, with damage to some individual trees approaching moderate.

Bark Beetles

Eastern Larch Beetle, Dendroctonus simplex, continues to be associated with Larch Decline.

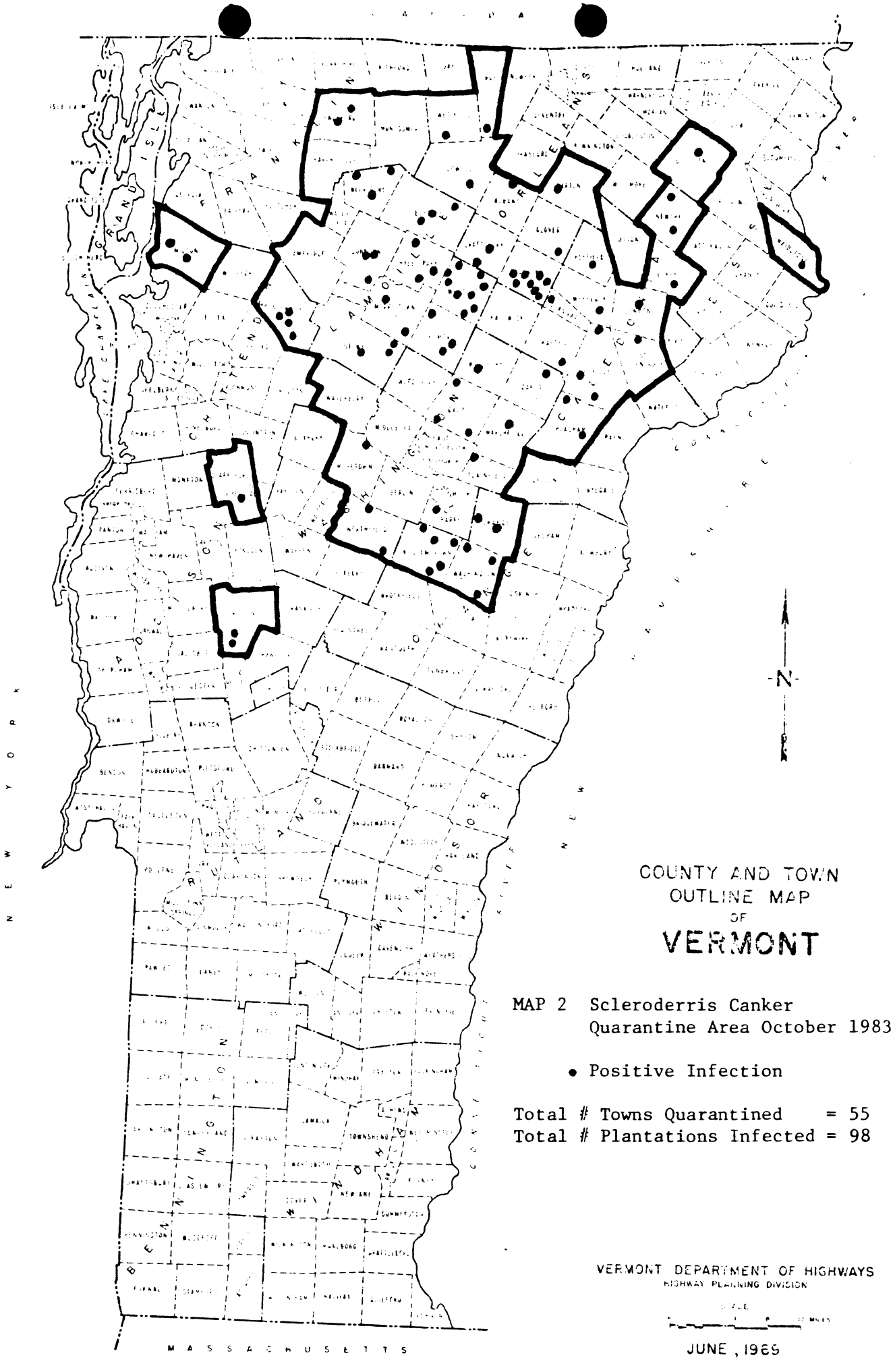
FOREST DISEASES

Stem Diseases

Scleroderris Canker, caused by Gremmeniella abietina was not found in any new towns this year and the quarantine area remains the same as in 1981 and 82 (Map 2). This year, 50 pine Christmas tree plantaions in 28 towns were inspected within the quarantine area and two plantations were found to be infected with the disease. Trees removed from these plantations can be sold only within the quarantine area. Another 75 pine plantations totaling about 200 acres were surveyed in 23 towns bordering the existing quarantine zone. None of these were found to be infected.

An intensive survey of all red and Scots pine in the towns of Troy, Westfield, and Lowell is presently being conducted. It is hoped that these towns can eventually be deregulated by silvicultural treatment of the known infected plantations (1 per town), provided no additional plantations are found to be infected.

Newly infected branches remain about as prevalent as in 1982. The wet May this year probably promoted many new infections but symptoms from 1983 infection will not be fully evident until next spring. Total number of plantations known to be infected is now 98, consisting of 84 red pine plantations and 14 Scots pine plantations, representing 728, and 49 acres, respectively. Tree mortality remains limited to 8 plantations comprising 40 acres.



COUNTY AND TOWN OUTLINE MAP OF VERMONT

MAP 2 Scleroderris Canker Quarantine Area October 1983

• Positive Infection

Total # Towns Quarantined = 55
Total # Plantations Infected = 98

VERMONT DEPARTMENT OF HIGHWAYS
HIGHWAY PLANNING DIVISION

JUNE, 1965

Beech Bark Disease, caused by Cryptococcus fagi and Nectria coccinea var. faginata continues to cause widespread scattered mortality of beech. Beech crowns exhibited more symptoms of decline than during previous years, probably due to the additional weather-related stress factors that were affecting other trees as well. Beech scale populations remain at light but increasing levels as observed in 1982.

White Pine Blister Rust, caused by Cronartium ribicola, remains at fairly low infection rates in most locations but may be increasing. Young white pines in two Lamoille County locations were found to have small branch cankers resulting from infection in the fall of 1982. Ribes control for the state nursery was completed this summer, using Roundup herbicide at the rate of 2 oz. per gallon of water. Over 400 plants were treated, with excellent results.

Dutch Elm Disease, caused by Ceratocystis ulmi, continues to kill many elms, with no observed change in the rates of mortality.

Cytospora Canker, caused by Cytospora Kunzei, remains a common cause of branch mortality of white and blue spruce, especially the latter.

Hypoxylon Canker, caused by Hypoxylon pruinatum, remains widespread on aspen. Many cankered aspens snapped off during heavy windstorms this summer.

Fireblight, caused by Erwinia amylovora, killed one apple tree in Lamoille County and was a common cause of fruit tree dieback in Caledonia County.

Verticillium Wilt, caused by Verticillium albo-atrum, caused the death of a young ornamental sugar maple in St. Johnsbury.

Black Knot, caused by Apiosporina morbosum, remains widespread on black, pin, and chokecherry.

Foliage Diseases

Fir-Fern Rust of balsam fir, caused principally by Uredinopsis mirabilis, caused widespread defoliation of balsam fir Christmas trees (Figure 5). The cool wet spring weather was undoubtedly responsible for the increased damage compared to only light damage in 1982. Most balsam fir plantations with any ferns present suffered some damage, and over 100 acres of moderate to heavy damage is known to have occurred. Several Christmas tree growers mowed their plantations to keep the alternate host fern plants down, while others expressed an interest in controlling the ferns, principally sensitive fern, with herbicide treatments.

Lophodermium Needle Cast, caused by Lophodermium pinastri, was responsible for light damage to Scots pine Christmas trees in scattered locations.

Swiss Needle Cast, caused by Phaeocryptopus guamani, again caused moderate to heavy damage to a small Douglas-fir Christmas tree plantation in Moretown.

Anthracnose, caused by Gnomonia or Gloeosporium spp., caused more injury than usual to leaves of hardwoods. Damage was most noticeable on high elevation maples and ornamental maples, oaks, and ashes. The wet spring weather probably promoted infection.

Root Rots

Shoestring Root Rot, caused by Armillariella mellea, continues to be found in association with trees in a state of decline.

Annosus Root Rot, caused by Heterobasidion annosum, was not found in any new locations and rates of spread in old infection centers remains slow.

Diebacks, Declines and Environmental Diseases

Larch Decline and mortality continues to be evident on 4271 acres of larch stands, mostly in Washington and Caledonia counties, but has tapered off in most other locations. One exception is Essex County, where 684 acres were reported for the first time this year. Only larch stands showing current decline symptoms were aerially mapped this year. An increase of 249 acres in Washington County and the new acreage for Essex County brings the total acreage known to be affected (since we began mapping larch decline in 1976) to 7169 acres. The difference between this and the 4271 acres reflects the fact that the decline has already run its course in many stands. Heavy populations of eastern larch beetle continue to be associated with larch decline.

Ash Dieback appears to be increasing, at least in areas previously defoliated by forest tent caterpillar. White ashes within plots established in the Camel's Hump area in 1982 exhibited an increase in branch dieback in 1983. White ashes in Roxbury State Forest exhibited decline early this spring but much of this was attributed to frost damage. Core samples indicated slow growth over the past several years, however.

White Pine Needle Blight affected individual susceptible white pines throughout the region. Often referred to as semimature-tissue needle blight (SNB), this phenomenon is characterized by a reddish-brown discoloration of the terminal portions of the current year's needles only. Some pathologists believe that symptoms are produced by cloudy moist weather abruptly followed by continuous hot, dry weather during needle elongation. This description certainly fits this summer's weather pattern. Other investigators believe air pollution may contribute to the production of needle blight symptoms. The pattern of blight on some trees was characteristic of ozone damage but it is not known whether this pollutant was a factor in causing some of the blight.

Birch Decline, especially of white birch, was evident on many mountain slopes, particularly on well-drained sites. Close examination revealed recent branch dieback, dried up leaves in mid-summer, and evidence of ambrosia beetle attacks. The latter is a sure sign that the trees are under stress.

Frost damage to balsam fir shoots was light but very widespread throughout northeastern Vermont.

A General Off-Color of Hardwoods was very prevalent throughout the mountains by mid-summer. Leaf scorch from drought stress and anthracnose were undoubtedly responsible for some of the coloration. Upper crown leaves exhibited the most browning and some leaf drop occurred as early as July, possibly because of the sudden change in weather from cold and wet to hot and dry. The problem was particularly evident on maples, especially on shallow, upper elevations. One 4 acre ridgetop area of severe maple dieback in Starksboro was mapped during the aerial survey. But other tree species showed increased signs of stress as well. Areas which had been defoliated by forest tent caterpillar during the past few years were particularly easy to locate because of their off-color compared to surrounding forests.

Sugar Maple Decline continues to increase on ornamentals as well as in forest stands. Damage is particularly evident in areas previously defoliated by forest tent caterpillar, especially in Lamoille County. Widespread branch and top dieback was observed during the aerial survey for nearly every stand in the county damaged by forest tent caterpillar. The most damage is occurring in stands that had one year of moderate defoliation followed by one or two years of heavy defoliation. Stands that suffered no more than moderate defoliation generally look good. Some stands and sugarbushes in the region that were not defoliated also show increased dieback but this can generally be linked to poor site conditions combined with weather-caused stress factors. In some stands, poor management practices have placed an additional stress on the trees.

Red Spruce Decline was more evident at upper elevations than in the past. This was especially noticeable on both sides of Smuggler's Notch.

Red Maple Decline following heavy seed production in 1982 is scattered but widespread, with some tree mortality reported as having occurred this year.

Wind Damage caused by tornado-force winds knocked over numerous trees in Colchester and Essex (Chittenden County) in early August. High winds also caused widespread shredding of leaves and branch damage in Orleans and Caledonia counties. Wind damage to ornamentals is often linked to improper care when the trees were planted, resulting in poor branch unions and interior decay.

Ornamental Oaks in Caledonia County urban areas exhibited small, sparse leaves, particularly in the upper canopy. This is probably just one more indicator of the weather-related stress that occurred this year.

Animal Damage

Porcupine damage was reported as increasing in the Northeast Kingdom. Elsewhere, damage and landowner complaints remain at low levels.

Red Squirrel damage to maple tubing was light this year, with only a few complaints received from sugarbush owners.

Mouse or deer damage was not reported this year.

Figure 1 Bruce spanworm larva (center) and typical pattern of defoliation on sugar maples.

Figure 2 Spruce budworm larva.

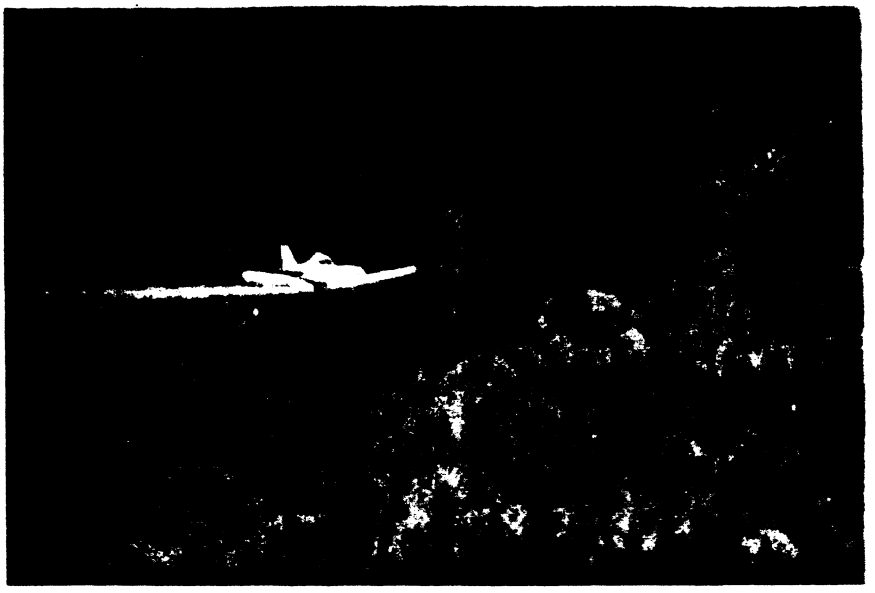


Figure 3 Aerial spraying to control spruce budworm. Note the white balloon corner-marker just below the plane.

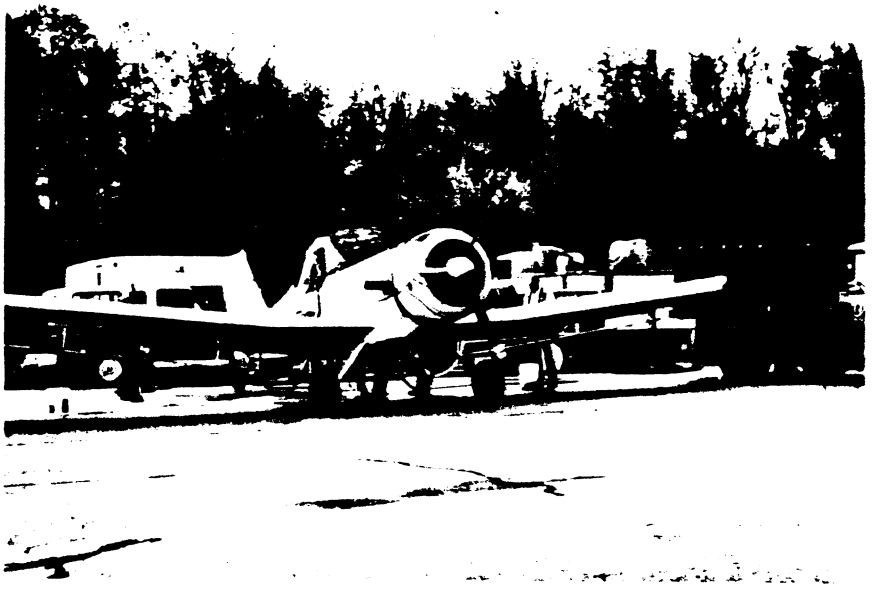


Figure 4 Spray plane and airport operations at Caledonia airport.

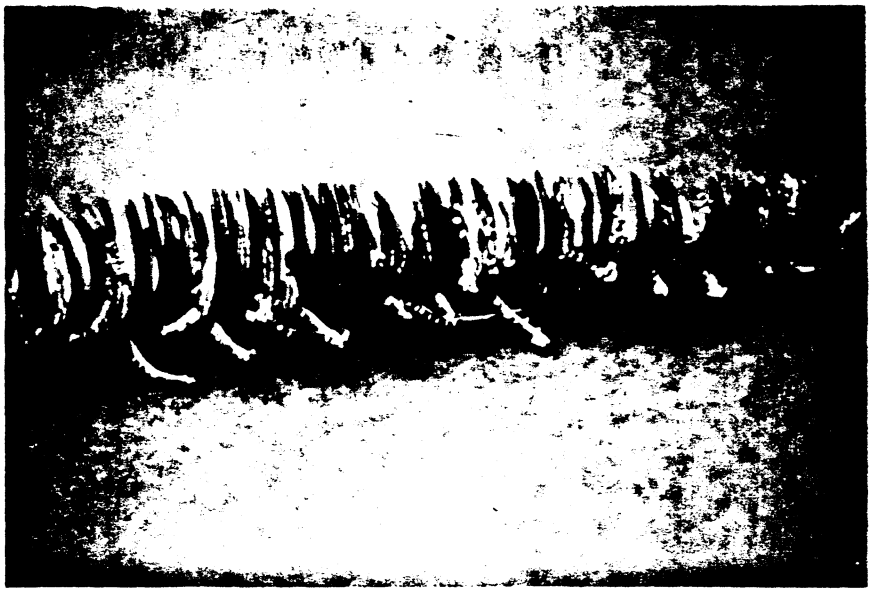
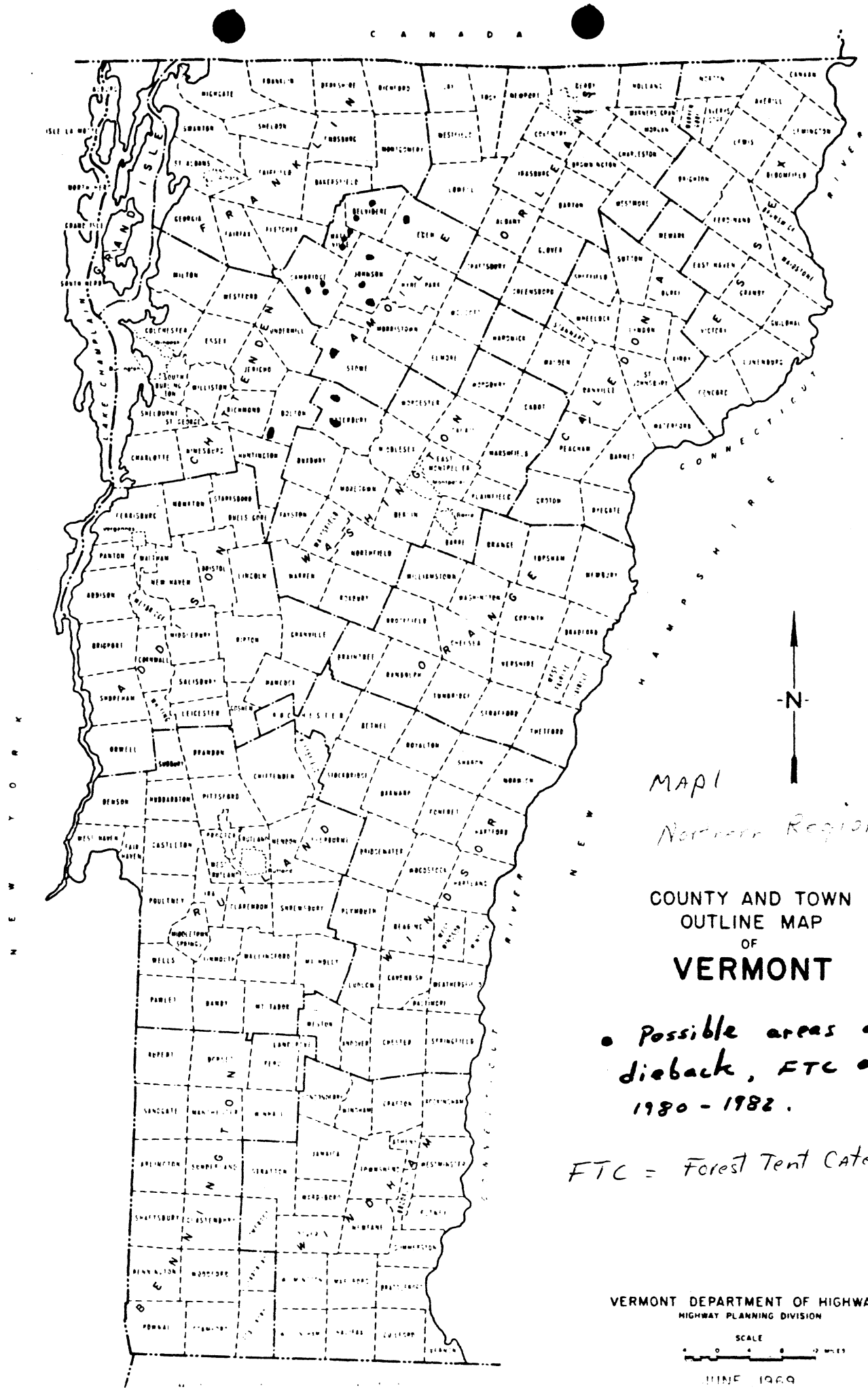
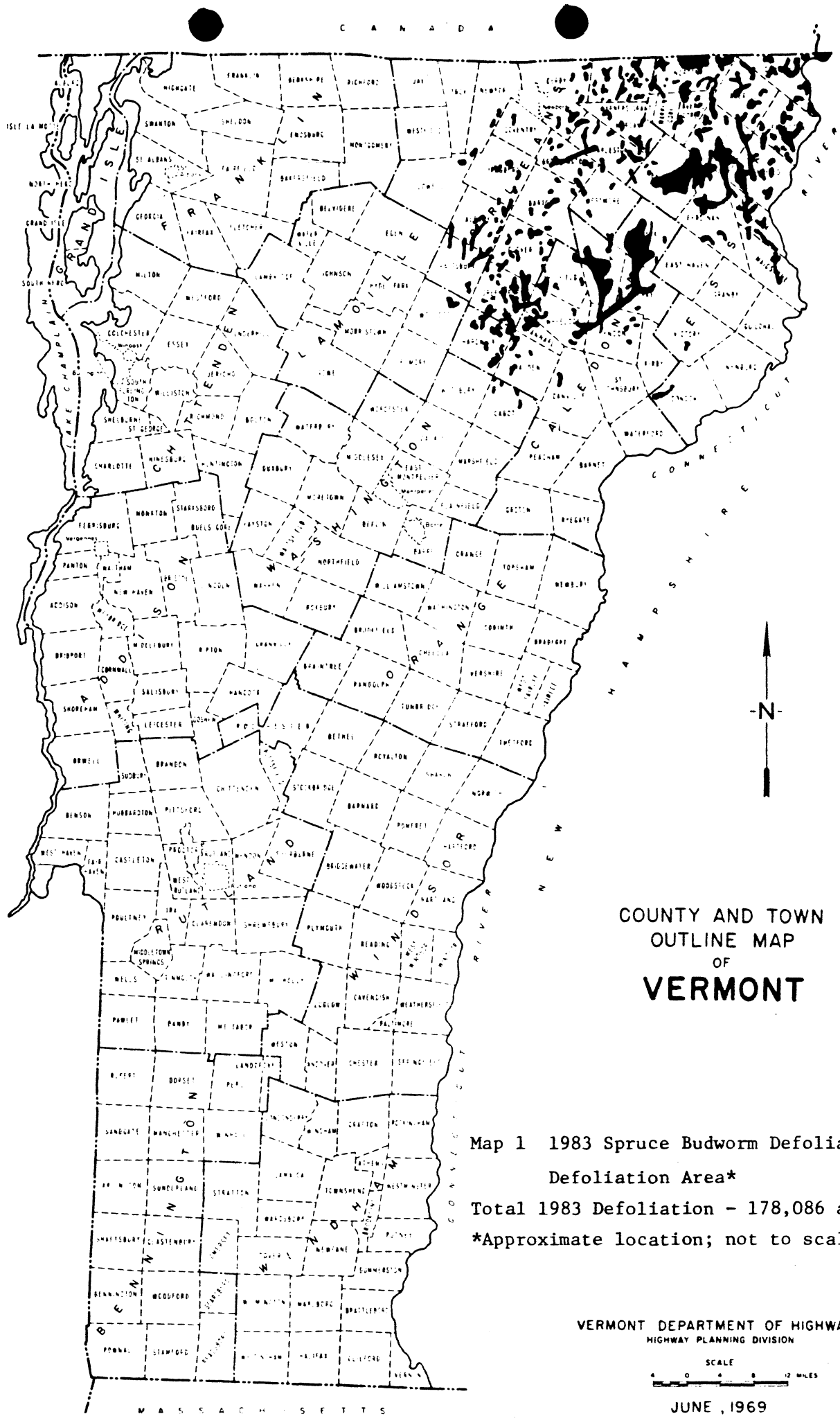


Figure 5 Fir-fern rust on balsam fir, showing numerous white columnar fruiting bodies of the fungus-


CANADA
NEW YORK
LAKE CHAMPLAIN
CONNECTICUT RIVER
NEW HAMPSHIRE
N
MAP 1
Northern Region
COUNTY AND TOWN
OUTLINE MAP
OF
VERMONT
• Possible areas of dieback, FTC areas 1980 - 1982.
FTC = Forest Tent Caterpillar
VERMONT DEPARTMENT OF HIGHWAYS
HIGHWAY PLANNING DIVISION
SCALE
JUNE 1969



COUNTY AND TOWN OUTLINE MAP OF VERMONT

Map 1 1983 Spruce Budworm Defoliation

Defoliation Area*

Total 1983 Defoliation - 178,086 acres

*Approximate location; not to scale

VERMONT DEPARTMENT OF HIGHWAYS
HIGHWAY PLANNING DIVISION

SCALE

4 0 4 8 12 MILES

JUNE, 1969